

DOCUMENT RESUME

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ABSTRACT

This self-evaluation instrument is used to nominate and evaluate schools for the Indoor Air Quality Management in Schools award. The evaluation contains three categories: Communications/Training; Design; and Operations/Maintenance. Each principle is detailed along with the required criteria used to meet that principle. Communications/Training pertains to school systems only. The communication principle is a formal system that increases opportunities for resolution of IAQ episodes. The training principle focuses on the maintenance of the knowledge and skills necessary to support and implement an IAQ management program through training. The Design category pertains to nominated schools only and addresses principles that cover air cleaning (filtration) design that results in greater removal of respirable particulates; condensation pan design that minimizes biological contaminants; local exhaust system design that eliminates the contaminate at its source; the minimization of volatile organic compound effects on the health of construction workers and building occupants; maintaining and using carpet in facilities as sources of contaminants; using ducted HVAC air supply and return plenums that are more easily kept free of contaminants; keeping outside air intakes separate from known building air contaminate sources; commissioning HVAC systems before occupancy to avoid indoor air quality problems; and using a walk-off system to avoid particles being tracked into the building. The Operations/Maintenance category pertains to nominated schools and addresses the issues of carpet, integrated pest management, moisture control, documentation and inspections, volatile organic compounds, renovation/maintenance, and cleaning materials and processes. (RE)

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ED 415 664

SELF-EVALUATION INSTRUMENT

Awards Program for Indoor Air Quality Management in Schools

January, 1998

Maryland State Department of Education
Division of Business Services
School Facilities Branch
200 W. Baltimore Street
Baltimore, MD 21201
(410) 767-0098

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EF 005 016

This evaluation instrument has been completed by:

NAME: _____

TITLE: _____

SCHOOL SYSTEM: _____

TELEPHONE #: _____

DATE: _____

SIGNATURE: _____

The following school is nominated:

NAME OF SCHOOL: _____

ADDRESS: _____

TELEPHONE #: _____

**Our school system and the _____ school have been
evaluated in the following group (check one):**

☐ **Group 1 (using criteria in all three categories: Communications/Training; Design;
and Operations/Maintenance)**

☐ **Group 2 (using criteria in two categories: Communications/Training; and
Operations/Maintenance)**

**This evaluation instrument, with a cover letter, must be received at the following address on or
before March 9, 1998:**

**Allen Abend, Chief
School Facilities Branch
Maryland State Department of Education
200 W. Baltimore Street
Baltimore, MD 21201-2595**

COMMUNICATIONS/TRAINING

(Pertains to school system only
with the exception of #4 under Training)

COMMUNICATIONS

Principle

A well thought out, formal communication system is an important part of a successful indoor air quality management program. Good communication raises building occupant confidence and increases the opportunity for resolution when an IAQ episode occurs.

Criteria (required)

1. An Indoor Air Quality manager has been formally designated in the board of education central office. The name of the IAQ manager is: _____ YES ☐ NO ☐
2. A formal system-wide procedure to respond to IAQ complaints has been established and is in use. (If YES, proceed to Training) (If YES, submit formal procedure) YES ☐ NO ☐

A formal procedure to respond to IAQ complaints will be established, in use, and submitted to the MSDE School Facilities Branch by September 1, 1998. YES ☐ NO ☐
3. An association with your local Health Department has been established regarding Indoor Air Quality Management. (If YES, submit documentation) YES ☐ NO ☐

TRAINING

Principle

Training of school administrators, parents, maintenance staff, teachers, and others maintains the knowledge and skills necessary to support and implement an IAQ management program.

Criteria

1. All school principals (or other senior school administrators) have received a minimum of one half hour of IAQ training, including procedures to respond to an IAQ complaint. (If YES, proceed to Item 2) YES ☐ NO ☐

By November 1998, all school principals (or other senior school administrators) will have received a minimum of one half hour of IAQ training, including procedures to respond to IAQ complaints.

YES ☐ NO ☐

2. The IAQ manager receives IAQ training on an annual basis to improve knowledge and skills in this highly technical and changing field.

* More than six hours of instruction/year,

YES ☐ NO ☐

* Two to six hours of instruction/year.

YES ☐ NO ☐

(If YES, submit a copy of the training program(s) attended by the IAQ manager between January 1997 and December 1997)

3. Staff that maintains HVAC systems have received a minimum of one hour of IAQ training between June 1996 and December 1997. (If YES, submit a copy of the training program(s) and a list of those individuals attending including their name and title)

YES ☐ NO ☐

4. The Chief Custodian or other custodial staff representative in the nominated school has received a minimum of one hour of IAQ training between June 1996 and December 1997. (If YES, submit a copy of the training program(s) and the name and title of the individual attending)

YES ☐ NO ☐

By November 1998, the Chief Custodian will have received a minimum of one hour of IAQ training including housekeeping topics.

YES ☐ NO ☐

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DESIGN

(Pertains to nominated school only, fill out for Group 1 only)

(Submit construction specifications when indicated below)

AIR CLEANING (Filtration)

Principle

Air filtration in HVAC systems removes particulates resulting in a cleaner air supply to occupants, and a reduction in contamination of HVAC equipment. The more effective the filter system, the greater the removal of respirable particulates. A reduction in the frequency of coil cleaning and energy cost due to dirty coils will also result.

Access to filters is required for periodic inspection.

Criteria

- 1a. Unit ventilator systems are predominant in the building and, the air filter has a minimum average efficiency of 25%-30% using the ASHRAE Standard 52-76, the Dust Spot Method. (If YES, proceed to item 2; if NO, proceed to 1b.) (If YES, submit construction specifications from bid documents) YES ☐ NO ☐
- 1b. Centralized HVAC systems are predominant in the building and the air filtration system for supply air has the capability of 30% efficiency or greater using the ASHRAE Standard 52-76, the Dust Spot Method.
- * 45-60% efficient, YES ☐ NO ☐
- * 30-45% efficient. YES ☐ NO ☐
- (If YES, submit construction specifications from bid documents)
2. All filters are readily accessible for inspection, and replacement or cleaning. YES ☐ NO ☐

CONDENSATE PANS

Principle

Design must minimize condensate pans as a potential source of biological contaminants and provide for ease of inspection.

Criteria

1. Condensate pans are designed with a minimum of a 1/4" slope. (1/8" for unit ventilators) YES ☐ NO ☐
2. Condensate pans are designed with a slope in two directions. YES ☐ NO ☐
3. Condensate pans are readily accessible for inspection and cleaning. YES ☐ NO ☐

LOCAL EXHAUST SYSTEMS

Principle

One effective and often necessary control for contaminants generated by occupant activities is to eliminate the contaminant at its source with a localized exhaust system to the outdoors.

Criterion

1. A local exhaust system to the outdoors has been provided in required locations such as fume hoods in science laboratories, kiln-firing areas, lavatories, food preparation areas in family/consumer science laboratories, finishing areas in technology education laboratories, kitchens, and welding areas. YES ☐ NO ☐

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VOLATILE ORGANIC COMPOUNDS (VOCs)

Principle

There are hundreds of VOCs that have been identified in Indoor Air Quality studies. Construction projects typically involve numerous sources including paints, varnishes, adhesives, caulking, carpet systems, and resilient floor coverings. In concentrations sometimes found in occupational settings, VOCs can have a wide range of known health effects. Very limited research has been conducted linking specific VOCs at known non-occupational indoor air concentrations to effects on human comfort and health. The goal is to minimize exposure to construction workers and building occupants.

Criteria

1. Only carpet products meeting the Carpet and Rug Institute's VOC Testing Program criteria have been specified and used. (If YES, submit construction specifications from bid documents) YES ☐ NO ☐
2. Only low VOC emitting carpet or multipurpose adhesives that meet the Carpet and Rug Institutes VOC Testing Program have been specified and used. (If YES, submit construction specifications from bid documents) YES ☐ NO ☐
3. Carpet systems were aired during installation and for a minimum of 72 hours after installation (and before occupancy) using the building HVAC system at normal temperature and maximum outdoor air without recirculating air from the area of installation into the HVAC system. (If YES, submit construction specifications from bid documents) YES ☐ NO ☐

CARPET

Principle

Carpet should not be used for extremely heavily trafficked areas such as entrances and corridors or in proximity to water and food. The required maintenance is too time consuming and costly. Without proper maintenance, carpet will have a shortened life span and will become a contaminant source for the indoor air.

Criterion

1. Carpet systems were not used in extremely heavily trafficked areas such as entrances and corridors or in proximity to water and food sources such as drinking fountains, classroom sinks, cafeterias, and teacher dining rooms. (If YES, submit floor finish schedule from bid documents) YES ☐ NO ☐

DUCTED HVAC AIR SUPPLY AND RETURN

Principle

Return air plenums that are non-ducted, such as a suspended ceiling cavity, are easily disturbed by maintenance and renovation activities. Ceiling cavities are also prone to collecting dust, debris, moisture, and fibrous material. In comparison, ducted return systems are more easily kept balanced and free of contamination.

Interior duct lining presents a greater surface area than unlined duct, a greater ability to absorb moisture and the potential for damage during or after installation. These characteristics pose a higher probability of microbiological contamination and more aggravated problems than would result in an unlined duct. Further, the cleaning of a contaminated lined duct would be more problematic than cleaning of an unlined duct.

Access to ductwork is required for periodic inspection.

Criteria

- | | | | |
|----|--|------------------------------|-----------------------------|
| 1. | All return air plenums are hard ducted. | YES ☐ | NO ☐ |
| 2. | Internal fibrous duct lining has been avoided or minimized in the HVAC system. | YES ☐ | NO ☐ |
| 3. | Access into ductwork is provided at key locations for periodic inspection. | YES ☐ | NO ☐ |

OUTSIDE AIR INTAKE

Principle

Outside air intakes must be separated from known sources of air contaminants generated from the building or in proximity to the building.

Criteria

- | | | | |
|----|---|------------------------------|-----------------------------|
| 1. | Outside air intakes are located a minimum of seven (7) feet vertically and twenty-five (25) horizontally from a cooling tower, loading dock, an exhaust serving a science laboratory fume hood, chemical storage room or career technology education laboratories that produce fumes or gases (e.g., welding, spray painting) | YES ☐ | NO ☐ |
|----|---|------------------------------|-----------------------------|

- | | | |
|----|---|--|
| 2. | Outdoor air intakes are located a minimum of fifteen (15) feet horizontally from a driveway or street and fifty (50) feet from a limited access highway. | YES ☐ NO ☐ |
| 3. | Outdoor air intakes are located a minimum of six (6) inches above grade, and in proximity to soil/ground cover that does not remain moist for extended periods of time. | YES ☐ NO ☐ |

COMMISSIONING

Principle

The commissioning of the HVAC system before occupancy will avoid many indoor air quality problems. The focus of commissioning includes the balancing of air and water flows, verification of performance by testing, completing system documentation, and training of operating staff.

Criteria

- | | | |
|----|---|--|
| 1. | The ventilation systems were balanced before occupancy in accordance with ANSI/ASHRAE Standard 111-1988. The supply air flow at each outlet and each outside air intake was measured and adjusted to within 90% of the design air flow rates. | YES ☐ NO ☐ |
| 2. | All drain pans were tested before occupancy to ensure proper slope and drainage. | YES ☐ NO ☐ |
| 3. | The HVAC automatic controls were tested before occupancy to ensure proper performance. | YES ☐ NO ☐ |
| 4. | The air flow rates of all local exhaust systems (e.g., in science labs or kiln rooms) were measured before occupancy to ensure they met design standards. | YES ☐ NO ☐ |
| 5. | Commissioning was performed under the general contractor. | YES ☐ NO ☐ |
| | Commissioning was performed by others than the general contractor such as the mechanical engineer. | YES ☐ NO ☐ |
| 6. | HVAC operations staff received training in the start-up, shut-down, and operation of the HVAC system. | YES ☐ NO ☐ |

WALK-OFF SYSTEM

Principle

An effective walk-off system (e.g., mats) is the "first line of defense" against particles being tracked into a building. An effective walk-off system can reduce the costs for dusting, vacuuming, and sweeping and increase the life of floor finishes.

Criterion

1. An effective walk-off system for primary entrances has been included in the building design or effective walk-off mats provided.

YES ☐ NO ☐

OPERATIONS/MAINTENANCE

(Pertains to nominated school only with the exception of Renovation/Maintenance on Page 13)

CARPET

Principle

With the decision to use carpet in schools comes a corresponding commitment to implement a preventive and scheduled maintenance program. Without proper maintenance, carpet will have a shortened life span and will become a contaminant source for the indoor air.

Because of high density of occupants and varied programmatic uses, carpet systems in schools require an intensive maintenance program. The majority of carpet requires daily vacuuming and wet cleaning (shampooing and/or hot water extraction) several times each year.

Criteria

1. Carpet in instructional areas, administration reception, media center circulation, and other high traffic areas is vacuumed regularly during each week the building is in use. A two motor vacuum is used with at least 5 micron filtration. (If YES, submit vacuum manufacturers specifications on filtration)

* Vacuuming 4-5 times each week,

YES ☐ NO ☐

* Vacuuming 3 times each week.

YES ☐ NO ☐
2. Carpet in light or medium traffic areas such as conference rooms and office space are vacuumed at least once or twice weekly using a two motor vacuum with at least 5 micron filtration. (If YES, submit vacuum manufacturer specifications on filtration)

YES ☐ NO ☐
3. Carpet in high traffic areas are cleaned using shampooing and/or hot water extraction (not bonnet cleaning) two or more times each year.

YES ☐ NO ☐

INTTEGRATED PEST MANAGEMENT

Principle

IPM emphasizes the use of non-chemical techniques for the management of pests, relying on the use of pesticides only when non-chemical strategies are not effective. Each building receives an initial inspection for the purpose of identifying existing or potential problems that may contribute to harboring, feeding, or population growth. The inspector recommends sanitation measures, physical changes, and other techniques to prevent problems before they occur. The inspector recommends monitoring when appropriate.

Should preventive methods fail to control the problem, the inspector recommends non-chemical pest control measures. Finally, the inspector lists options for chemical treatments should the preventive and non-chemical measures prove to be unsuccessful. Less toxic chemical treatments will be given preference over more toxic approaches.

Criteria

1. IPM has been implemented in the school. (If YES, submit a copy of the IPM Program) YES ☐ NO ☐

IPM will be implemented in the school and a copy of the program submitted to the MSDE School Facilities Branch by September 1, 1997. YES ☐ NO ☐

MOISTURE CONTROL

Principle

The introduction of moisture caused by roof failures, plumbing failures, below grade water intrusions, and other circumstances can result in microbial contamination of building materials and potential comfort or health problems for building occupants. Damaged building materials must be repaired and replaced quickly to prevent air contamination.

Criteria

1. There is no evidence of moisture damage to building materials. YES ☐ NO ☐
If damage has occurred, the moisture contaminated materials have been removed and the area repaired. (If YES, go to next page; if NO, proceed to item 2)
2. There is no evidence of microbial contamination to building materials. If microbial contamination has occurred, the contaminated materials have been quickly removed and the area repaired. YES ☐ NO ☐

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HVAC DOCUMENTATION AND INSPECTIONS

Principle

An operations manual should be available that describes how to run the building systems. The manual provides a detailed step-by-step procedure covering operation from start-up to shutdown. This document is a useful training document for new facility management employees. A vital part of this manual is a compilation of all available manufacturers literature and manuals.

The operational manual covers the building system instrumentation that will gather information or data on physical plant system performance. It lists design criteria; performance criteria; acceptable ranges for fluctuations in gauges, meters, and recorders, and trouble shooting strategies. Information on the frequency of both routine and preventive maintenance is also included. Most, if not all, of this information is readily available from the manufacturers.

Regular checks of HVAC components are crucial to the success of an IAQ management program.

Criteria

1. The individual(s) responsible for operating the building have been provided easy access to an operations manual for the HVAC system. YES ☐ NO ☐
2. Local exhaust systems in science laboratories, kiln-firing areas, career education laboratories, family/consumer science, technology education, and other locations are inspected annually including a flow measurement. YES ☐ NO ☐
3. Condensate pans are inspected regularly and cleaned as necessary.
 - * Inspected semi-annually YES ☐ NO ☐
 - * Inspected annually YES ☐ NO ☐
4. Filters are changed regularly according to manufacturers recommendations or consistent with accepted practice (by either pressure drop or on a regular time schedule) and checked for frame or other deficiencies. YES ☐ NO ☐
5. Outside air intakes are inspected regularly for proper operation and cleanliness.
 - * Inspected semi-annually YES ☐ NO ☐
 - * Inspected annually YES ☐ NO ☐
6. An annual inspection is done to verify that all dampers, valves, fans, Variable Air Volume devices and other active components which are part of the base building mechanical system respond, as designed, to controls. YES ☐ NO ☐

(Submit maintenance records for all criteria, 2-6, that you answered YES)

VOLATILE ORGANIC COMPOUNDS (VOCs)

Principle

Many materials used in housekeeping, maintenance, pest control, and cafeteria services can affect air quality by short and long term emission of VOCs. Their use in the building should be properly managed. Material Safety Data Sheets (MSDS) should be obtained from the manufacturers or distributors and kept on file. The chemical composition of hazardous ingredients should be evaluated along with the hazardous reaction potential. Wherever possible, materials that present the lowest toxic potential should be used. Less toxic materials should be substituted for more toxic materials. In general, water soluble materials should be given preference to organic solvent systems. Materials that are higher in flash point (ignition) and/or have a lower vapor pressure are preferred.

Criterion

1. Materials used for housekeeping, maintenance, pest control, and cafeteria services are screened through the use of MSDSs, and scheduled for use, and stored to minimize exposure of building occupants to volatile organic compounds. YES ☐ NO ☐

RENOVATION/MAINTENANCE (Pertains to school system only)

Principle

Demolition, construction, and the application of finishes in an existing building generate particulates, gases, and vapors by disturbing existing materials or by introducing new materials. Various techniques should be used to minimize the exposure of occupants to air contaminants.

Criteria

1. Whenever possible, major renovation or maintenance work is scheduled during unoccupied periods or periods of least occupancy. YES ☐ NO ☐
2. For significant renovation or maintenance projects, plastic sheeting is used to create a barrier between the work area and the remainder of the building. YES ☐ NO ☐
3. The work area, for significant renovation or maintenance projects, is placed under negative pressure. YES ☐ NO ☐
4. The HVAC system serving the occupied portion of the building is protected from contamination from the work area. YES ☐ NO ☐
5. Roof replacement projects are scheduled while students are not occupying the building except for emergency work. YES ☐ NO ☐

(Submit typical construction specifications if criteria 2, 3, or 4 are answered YES)

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CLEANING MATERIALS & PROCESSES

Principle

Cleaning provides well documented benefits in terms of creating cleaner, safer, and healthier indoor environments. An improperly maintained indoor environment could give rise to biological contaminants and buildup of particulate matter which can cause comfort and health effects. Careful use and selection of cleaning products and processes, along with following label directions is important to protect the comfort and health of building occupants and cleaning personnel.

Criteria

1. Clear and concise plans have been established that outline the cleaning schedules (e.g., vacuuming carpet, dust mopping floors, cleaning walk-off mats) and workloads for each staff member. Major cleaning operations such as floor stripping procedures are scheduled during unoccupied periods. YES ☐ NO ☐
2. Training has been provided to custodial staff on cleaning procedures (e.g., vacuuming, floor stripping, hot-water extraction) and the OSHA requirements on Hazards Communications. MSDS sheets are readily accessible to cleaning personnel. (If YES, submit a copy of the training program(s) attended by custodial staff.) YES ☐ NO ☐
3. All containers including spray bottles are properly labeled. YES ☐ NO ☐